

# Audit



# Report

## OFFICE OF THE INSPECTOR GENERAL

### IMPLEMENTATION OF THE DOD JOINT TECHNICAL ARCHITECTURE

Report No. 98-023

November 18, 1997

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### **Acronyms**

ASD(C <sup>3</sup> I)	Assistant Secretary of Defense (Command, Control, Communications, and Intelligence)
JTA	Joint Technical Architecture



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November 18, 1997

MEMORANDUM FOR UNDER SECRETARY OF DEFENSE FOR ACQUISITION  
AND TECHNOLOGY  
ASSISTANT SECRETARY OF DEFENSE (COMMAND,  
CONTROL, COMMUNICATIONS, AND  
INTELLIGENCE)  
DIRECTOR, JOINT STAFF

SUBJECT: Audit Report on Implementation of the DoD Joint Technical Architecture  
(Report No. 98-023)

We are providing this audit report for review and comment. We considered management comments on a draft of this report in preparing the final report.

Although you concurred with all recommendations, your comments on the draft of this report did not fully conform to the requirements of DoD Directive 7650.3. You deferred specific action plans to implement the recommendations until those plans could be formally accepted by the Architecture Coordination Council, scheduled to meet next in November 1997. Therefore, we request further comment specifying your plans to implement the report recommendations and the estimated completion dates of those actions. You should provide additional comments to us by January 16, 1998.

We appreciate the courtesies extended to the audit staff. Questions on the audit should be directed to Ms. Mary Lu Ugone, Audit Program Director, at (703) 604-9049 (DSN 664-9049) or Mr. James W. Hutchinson, Audit Project Manager, at (703) 604-9060 (DSN 664-9060). See Appendix D for the report distribution. The audit team members are listed inside the back cover.

Robert J. Lieberman  
Assistant Inspector General  
for Auditing

## **Office of the Inspector General, DoD**

**Report No. 98-023**

(Project No. 7RE-0019)

**November 18, 1997**

### **Implementation of the DoD Joint Technical Architecture**

#### **Executive Summary**

**Introduction.** The Joint Technical Architecture mandates a set of standards and guidelines for all DoD command, control, communications, and intelligence systems acquisition. The Joint Technical Architecture consists of a set of primarily commercial standards that cover information processing, transfer, content, format, and security. An August 22, 1996, memorandum cosigned by the Under Secretary of Defense for Acquisition and Technology and the Assistant Secretary of Defense (Command, Control, Communications, and Intelligence) made the Joint Technical Architecture mandatory for all DoD command, control, communications, and intelligence systems and for the interfaces to other key assets, such as weapons and office automation systems.

**Audit Objectives.** The audit objective was to assess DoD progress in implementing information processing standards as a means of achieving systems interoperability. Specifically, we reviewed DoD guidance and Component plans for implementation of the Joint Technical Architecture. The audit also evaluated the Office of the Assistant Secretary of Defense (Command, Control, Communications, and Intelligence) management control program related to the planning for the implementation of the Joint Technical Architecture.

**Audit Results.** The DoD does not have an integrated or coordinated approach to implementing the Joint Technical Architecture. As a result, the DoD has little assurance that the Joint Technical Architecture will effectively or efficiently meet DoD interoperability goals or that DoD will spend information technology funds efficiently. For details of the audit results, see Part I.

Management controls over the planning for and implementation of the Joint Technical Architecture were materially weak because none had been established. See Appendix A for details on the management control program.

**Summary of Recommendations.** We recommend establishing a method for coordinating Joint Technical Architecture implementation across DoD and for measuring and tracking implementation progress. We also recommend periodically disseminating information on factors that could impede or enhance Joint Technical Architecture implementation and establishing a review mechanism to assess interoperability levels.

**Management Comments.** The Acting Under Secretary of Defense for Acquisition and Technology, the Acting Assistant Secretary of Defense (Command, Control, Communications, and Intelligence), and the Joint Staff concurred with all

recommendations. The Acting Assistant Secretary of Defense (Command, Control, Communications, and Intelligence) also provided comments on the report's finding and discussion.

See Part I for a summary of management comments and Part III for the complete text of the comments.

**Audit Response.** Although management concurred with all recommendations, they deferred providing details of plans to implement those recommendations until the plans are presented to and approved by the Architecture Coordination Council at its next scheduled meeting. That meeting was scheduled for mid-November 1997.

Regarding the Acting Assistant Secretary's comments on the finding and discussion, we are fully aware of the current managerial philosophy of the senior leaders of DoD. However, we also recognize that it is not always successful when all DoD Components do not view an issue, such as implementing the Joint Technical Architecture, with the same level of importance. We also amended, as appropriate, some statements in this final report to include clearly describing the potential conflict between the standards required by the JTA and those to which some commercial software systems may be built. We clarified our concern about the resolutions of those potential conflicts and clarified that the JTA will be extended into weapon systems domains in the near term. We ask that the Under Secretary of Defense for Acquisition and Technology, the Acting Assistant Secretary of Defense (Command, Control, Communications, and Intelligence), and the Director for Command, Control, Communications, and Computers, Joint Staff provide comments setting forth plans of action for implementing the report's recommendations and the dates for those actions by January 16, 1998.

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## **Part I - Audit Results**

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## Audit Background

In the environment of reduced DoD budgets and staffing, senior DoD officials recognized that DoD could no longer afford to maintain the largely duplicative, Service-unique information systems developed by each of the armed services. Additionally, the military strategy of joint operations used in recent conflicts vividly illustrated that vertically oriented, "stove-pipe" systems could not easily interoperate or connect and pass information horizontally to other Component automated information systems because the systems often used different computer platforms and information exchange formats. In 1995, to help ensure interoperability of DoD information systems, the Assistant Secretary of Defense (Command, Control, Communications, and Intelligence) (ASD[C<sup>3</sup>I]) directed the establishment of a single, consensus-based DoD technical architecture, upon which future computer system acquisitions and development would be based and toward which existing systems could evolve. The effort resulted in publication of the Joint Technical Architecture (JTA), which is a minimum set of rules governing the arrangement, interaction, and interdependence of parts or elements to ensure that a conformant system satisfies a specified set of requirements.

**Joint Technical Architecture.** Issued on August 22, 1996, the JTA mandates a minimum set of standards and guidelines for all DoD command, control, communications, and intelligence systems. The JTA specifies a set of performance-based, primarily commercial standards for information processing, transfer, content, format, and security. The JTA will be periodically updated, and its scope will evolve to ultimately include all DoD systems that produce, use, or exchange information electronically. The initial version of the JTA is applicable to all command, control, and intelligence systems and the computers and communications that support those systems. Included are all sustaining base, combat support, and office automation systems and related interfaces to other key assets, such as weapon systems. Future JTA versions will extend its scope into weapon systems and other areas to achieve greater levels of interoperability.

**Common Operating Environment.** The primary method of implementing the JTA will be through the use of a common operating environment. A common operating environment provides a standard set of common software services, such as data management, communications, and graphics through standard application program interfaces. By building modular, functional applications that use a common software infrastructure accessed through a standard set of application program interfaces and a standard integration approach, developers are able to "plug-and-play" their applications into a centrally maintained infrastructure.

**Clinger-Cohen Act of 1996.** The Clinger-Cohen Act of 1996, formerly called the Information Technology Management Reform Act of 1996, focuses on the need for Federal agencies to improve the way that they select and manage

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information technology resources. The Secretary of Defense has designated ASD(C<sup>3</sup>I) as principal staff assistant and advisor for matters relating to DoD information technology.

**Architecture Coordination Council.** In January 1997, the DoD Architecture Coordination Council (the Council) was formed to establish comprehensive architectural guidance for DoD and to determine how to rationalize and synchronize ongoing architecture work. The Council is co-chaired by the ASD (C<sup>3</sup>I), the Deputy Under Secretary of Defense for Acquisition and Technology, and the Director for Command, Control, Communications, and Computers, Joint Staff. It consists of senior management representatives from the Services and other DoD Components. The Council plans to meet quarterly to coordinate the development and implementation of the DoD architectural framework, which includes the JTA.

## Audit Objectives

The audit objective was to assess DoD progress in implementing information processing standards as a means of achieving systems interoperability. Specifically, we reviewed DoD guidance and Component plans for implementation of the JTA, identified factors that may enhance or hinder implementation, and evaluated planned methods to track implementation progress. We also reviewed the adequacy of the ASD(C<sup>3</sup>I) management control program as it applied to the primary audit objectives. See Appendix A for a discussion of the audit scope and methodology and the results of the review of the management control program.

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## **Implementation of the Joint Technical Architecture**

Although the major DoD Components have developed plans to implement the JTA, those plans do not reflect an integrated or coordinated DoD approach to implementation. The Component plans do not reflect a DoD-wide perspective for JTA implementation because Office of the Secretary of Defense planning guidance was minimal. Specifically, Office of the Secretary of Defense planning guidance did not provide for oversight and did not establish:

- the priority of JTA implementation for other DoD information technology initiatives,
- a JTA implementation schedule,
- the need for cross-Service and cross-functional coordination in developing JTA implementation plans, or
- a uniform methodology to measure and evaluate implementation progress and success.

Consequently, DoD has little assurance that JTA implementation will effectively or efficiently meet DoD interoperability goals. In addition, the lack of strategic guidance that relates the cost and priority of implementing the JTA to other corporate initiatives may result in the inefficient application of critical information technology funds. The JTA is a key ingredient in the overall DoD strategy to achieve interoperability.

### **JTA Implementation Guidance**

The Under Secretary of Defense for Acquisition and Technology and ASD(C<sup>3</sup>I) jointly implemented the JTA on August 22, 1996. The implementation memorandum states that the Services, Defense agencies, and other DoD Components are responsible for implementing the JTA to include enforcing, budgeting, and determining the pace of system upgrades. The memorandum states that, within 90 days, each Service, Defense agency, and applicable other Component should provide a plan that outlines the approach to implement the JTA to the ASD(C<sup>3</sup>I) and the Under Secretary of Defense for Acquisition and Technology.

On October 4, 1996, the ASD(C<sup>3</sup>I) provided supplemental guidance for developing JTA implementation plans. The ASD(C<sup>3</sup>I) requested that the plans include details on management and oversight structure, approach to configuration management, implementation procedures, use in specific

## **Implementation of the Joint Technical Architecture**

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functional domains, training, integration with other Component initiatives, and a strategy for assessing progress. The ASD(C<sup>3</sup>I) would identify DoD oversight responsibilities and provide integration guidelines addressing JTA configuration management and evolution, from a Defense-wide perspective, at a later date.

### **Component Implementation Plans**

The Components' responses to ASD(C<sup>3</sup>I) on JTA implementation did not fully comply with guidance and did not reflect a coordinated approach to implementation.

**Compliance With Implementation Guidance.** As of June 2, 1997, ASD(C<sup>3</sup>I) had received 17 DoD Component responses. Overall, the responses were incomplete and inconsistent.

Fewer than half of the DoD Components responded. Of the 17 responses received, 8 were detailed plans, 1 was a draft instruction, 3 were letters of intent, 2 were negative responses, and 3 were requests for an extension of time, with promises to provide plans at a future date. Among the organizations that did not respond are the Assistant Secretaries of Defense and the Chairman, Joint Chiefs of Staff. See Appendix C for details.

The responses varied widely. The Services' responses generally provided the specific information as requested in the October 4, 1996, guidance memorandum. The responses from the other DoD Components were not as complete. For example, three Components responded that they would not submit a plan because their new systems are compliant or the JTA did not presently apply to their information systems or the computers that support them.

The responses, when viewed as a whole, did not represent a uniform structure and a coordinated implementation strategy. The responses generally did not identify the Component's priority for JTA implementation, estimated cost, or implementation schedule. Only the plan of the Army indicated that the JTA was a high information technology priority. None of the plans gave estimates of implementation costs and how they would budget for them. Only the Army established a specific time as to when it expected to fully implement the JTA.

**Scope of Guidance.** We believe that important information was lacking because the ASD(C<sup>3</sup>I) guidance did not define integration guidelines from an overall DoD perspective. The lack of information on the DoD perspective of JTA implementation is a significant omission in the guidance. Without that information, the Components developed their JTA implementation plans without knowing essential planning information, such as estimated costs, the JTA priority for other programs and initiatives, and projected implementation schedules. Because specific funding for JTA implementation was not budgeted, fiscal resources for unprogrammed requirements may have serious effects. For example, the year 2000 problem (discussed in Appendix B) is expected to cost DoD more than \$1 billion. The ASD(C<sup>3</sup>I) guidance does not indicate what

## **Implementation of the Joint Technical Architecture**

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trade-offs may be necessary if all infrastructure elements and applications are to be JTA compliant "at appropriate levels" by 2002 or earlier, as stated in the DoD Information Technology Management Strategic Plan, dated March 1997.

**Requirement to Submit Plans.** The ASD(C<sup>3</sup>I) guidance is not clear on who should submit implementation plans. Although the guidance memorandums were addressed to the Secretaries of the Military Departments; the Chairman, Joint Chiefs of Staff; the Under Secretaries of Defense; the Assistant Secretaries of Defense; the Directors of the Defense agencies, and five other Components, the August 22, 1996, memorandum requests plans only from "Each Service, DoD Agency, and applicable other Component . . ." Therefore, we believe that the memorandum did not clarify the applicability of the JTA and its implementation for each addressee.

**Oversight and Integration.** The October 4, 1996, supplemental implementation memorandum states that the "Oversight responsibilities and integration guidelines addressing JTA configuration management and evolution, from a Defense-wide perspective, will be provided later." Also, guidance was not included on how and when implementation plans would be reviewed, and what, if any, coordination should be accomplished with other DoD Components. As of June 2, 1997, DoD did not have a formal process to receive, track, evaluate, or provide feedback on the Component JTA implementation plans. We discussed the lack of a defined DoD-level oversight and review process with an ASD(C<sup>3</sup>I) official, who stated that a review team is being formed and that criteria are being developed to analyze the plans. Based on that analysis, an oversight and review process will be established. The target date for completion of the review was August 1997.

**Diverse Approaches to Implementation.** We believe that the lack of definitive guidance from the ASD(C<sup>3</sup>I) is the primary reason why the Components took diverse approaches to JTA implementation. The most significant difference among the Military Departments' JTA implementation is that the plan of the Army places more emphasis on short-term implementation, whereas the Navy and the Air Force chose a more long-term approach. The difference in timing could cause uneven implementation of JTA, thus requiring additional effort to achieve interoperability.

**Army Implementation Plan.** The plan of the Army incorporates the JTA in its Army Technical Architecture, which was the genesis for the JTA. The Army has shown a greater commitment to implementation. The Army identified additional funding for JTA implementation, and Army senior management has mandated JTA compliance at the expense of system functionality, if necessary. Also, the Army has begun expansion of its technical architecture to include weapon systems. The Army has developed a migration plan for existing systems and has constructed a reporting mechanism to track compliance with the Army Technical Architecture and JTA.

**Navy and Air Force Implementation Plans.** The sense of urgency or importance of JTA implementation is not apparent in the plans and approaches of the Navy and the Air Force. The Navy and the Air Force have incorporated implementation of the JTA into their existing system acquisition processes.

Their implementation method does not require separate reporting or tracking, because JTA is incorporated into existing reporting and tracking systems. While embedding JTA implementation into existing business processes may be effective over time, that approach conveys no sense of urgency or importance. We believe that achieving interoperability could take much longer.

## Other Factors That Could Affect Implementation

All major factors that may affect JTA implementation are not included in the Component implementation plans. We identified several factors that could enhance or impede the JTA implementation process.

**Factors That Could Enhance Implementation.** We identified three major factors that could enhance implementation of the JTA. Those factors are the implementation of the Defense Information Infrastructure Common Operating Environment, the experience of the Army in implementing its Army Technical Architecture, and coordination within a functional area.

**Defense Information Infrastructure Common Operating Environment.** Implementation of the JTA will primarily be through the adoption of the Defense Information Infrastructure Common Operating Environment throughout DoD. Composed of a modular set of software that provides generic functions or software services, the Common Operating Environment provides a standard platform that mission area applications can be designed to access through standardized application program interfaces. The common environment allows software developers to concentrate on building mission area applications instead of building duplicative system support service software. Because the individual components of the Common Operating Environment will meet JTA standards, software developers require little effort to ensure that any specific application meets JTA standards. The consistent use of the Common Operating Environment will help achieve interoperability between DoD automated information systems, provide a common "look and feel" between systems, and minimize costs through systematic software reuse.

**Army Implementation Experience.** The Army has extensive experience in implementing a standard architecture because the Army has been implementing the Army Technical Architecture, which was used as the basis for the development of the JTA, for several years. Therefore, the Army has already confronted and solved many of the problems involved with implementing standard architecture in new and existing information systems. The next version of the JTA, expected in December 1997, will represent the initial extension into weapon systems domains. The Army also has experience in extending its technical architecture into its weapon systems. DoD could

## Implementation of the Joint Technical Architecture

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conserve resources during the ongoing JTA implementation process by taking full advantage of lessons learned and best practices determined by the Army in its implementation experiences.

**Implementation Coordination.** In April 1997, officials from the Offices of the Defense Information Systems Agency, the Assistant Deputy Under Secretary of Defense (Logistical Systems Development), and the Joint Staff sponsored a meeting to discuss the implementation of the DoD Total Asset Visibility Implementation Plan.<sup>1</sup> The strategy for implementation of the plan includes establishing clusters of capability rather than phasing combat support systems one at a time into the Global Combat Support System. "Clustering," the implementation of a group of systems that have data and functional relationships, is expected to be not only faster but cheaper. The concept could establish a model for cross-Service and cross-functional coordination, which is essential for effective and efficient JTA implementation.

**Factors That Could Impede Implementation.** Various factors may impede implementation of the JTA.

**Role of the Principal Staff Assistants.** The Office of the Secretary of Defense Principal Staff Assistants have oversight responsibility for their respective functional areas, such as acquisition, logistics, finance, personnel, or health affairs. However, their respective roles in implementing the JTA is undefined. Defining the role of the Principal Staff Assistants is important because their functional area systems support multiple DoD Components.

**Conflicting Mandates.** One of the DoD key acquisition reform goals is to reduce acquisition costs and remove impediments to commercial and military integration by following commercial practices as much as possible. The JTA emphasizes that DoD intends to use open systems products, where all vendors comply with selected standards, to provide the foundation for a seamless flow of information and interoperability and to obtain the most value for limited procurement dollars. However, commercial off-the-shelf software and the JTA may not be complementary because all commercial products may not be built to the standards specified in the JTA. Although we believe that most commercial software is compatible with the JTA, the potential exists that a commercial software product selected to best meet the needs of a particular system project manager may not conform to JTA requirements.

The DoD method to "certify" commercial software products as JTA compliant is not clear. Until that process is defined, the mechanism that individual program managers will have to resolve that potential conflict will also be unclear.

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<sup>1</sup>The DoD Total Asset Visibility Implementation Plan, dated November 1995, outlines the concepts, requirements, and milestones to provide a total asset visibility capability for the DoD. Total asset visibility is the capability to provide timely and accurate information on the location, movement, status, and identity of units, personnel, equipment, and supplies and to act upon that information to improve the overall performance of DoD logistics practices.

## **Implementation of the Joint Technical Architecture**

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**Importance of an Integrated Architecture.** An integrated architecture framework includes not only a technical architecture, but also an operational architecture and a systems architecture.<sup>2</sup> Although a technical architecture should be based on an operational architecture that identifies processing and information exchange requirements, DoD has chosen to develop the technical architecture first. Generally, personnel involved in architectural development that we talked to during the audit believed that developing DoD-level operational and systems architectures will be much more difficult and will take considerably longer than developing the JTA. They also felt, however, that until all three are defined, interoperability will not be fully achieved because the three types of architectures are so interconnected.

Not all factors that have the potential to influence implementation of the JTA are internal to DoD. Congress periodically issues legislation that affects the way that DoD manages its resources. Recent legislation that will affect the JTA is the Clinger-Cohen Act of 1996, which would require DoD to establish a process to select, manage, and evaluate the results of information technology investments.

## **Information Technology Management Reform**

A June 2, 1997, memorandum signed by Secretary of Defense William S. Cohen states that "Speed of implementation is crucial in matters pertaining to information technology. Unity of authority is key to this speed."

The Clinger-Cohen Act of 1996 (the Act), requires heads of executive agencies to designate a Chief Information Officer. The Act tasks the Chief Information Officer to provide advice and assistance in the area of information technology; to develop, maintain, and facilitate the implementation of a sound and integrated information technology architecture; and to promote the effective and efficient design and operation of information resources. The Act requires agencies to integrate their information technology investment plans and performance measures into the budget process. Subsequently, both the Secretary of Defense and the Secretaries of the Military Departments designated Chief Information Officers.

A June 2, 1997, memorandum signed by the Secretary of Defense clarified that the ASD(C<sup>3</sup>I) is the primary Chief Information Officer for DoD. The memorandum specifies that the Military Departments' Chief Information

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<sup>2</sup>The operational architecture identifies the operational elements, assigned tasks, and information flows required to accomplish or support a function. The technical architecture identifies the services, interfaces, standards, and their relationships. The systems architecture satisfies operational architecture requirements according to standards in the technical architecture by defining the physical elements of systems and interconnections that support functional areas.

## **Implementation of the Joint Technical Architecture**

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Officers will act as advisors to and will implement the policies and guidance issued by the DoD Chief Information Officer. The memorandum also establishes a Chief Information Officer Council (the Council) within DoD.

The Council was established as the principal forum to advise the Secretary and Deputy Secretary of Defense on matters related to information technology, to exchange pertinent information, to discuss issues regarding information technology, and to coordinate implementation of activities under the Clinger-Cohen Act within DoD. The Council is chaired by the DoD Chief Information Officer and has 10 additional members. Those members include the Military Department Chief Information Officers, who are also responsible for JTA implementation within their respective departments.

On July 8, 1997, the DoD Chief Information Officer distributed the DoD Chief Information Officer Business Plan (the Plan) to the DoD Components. The Plan's purpose is to identify the DoD Chief Information Officer's emphasis areas, priorities, and planned actions for improving information technology, acquisition, and management. One of the Plan's stated priorities concerned developing and implementing architectures, including extending the JTA into the weapon systems arena. It recognized the Architecture Coordination Council as the body for overseeing all architectural initiatives in DoD, and established architecture as an information technology priority.

## **Conclusion**

Interoperability is essential to the ability of joint military forces to provide timely response on a worldwide basis. Further, the JTA is a key initiative in achieving that goal. However, the JTA is not the only "key" DoD information technology initiative. Rather, it exists in an environment of other critical information technology programs and initiatives that compete for limited resources.

The DoD Component implementation plans for JTA and interviews with Army, Navy, and Air Force personnel indicate that the JTA is being implemented in an environment that is not consistent with attaining interoperable information processing systems in an integrated and coordinated manner. While effective JTA implementation plans may be developed at the Component level, it is the responsibility of the Office of the Secretary of Defense to establish a framework of strategic planning, policy, and guidance to support those plans.

The DoD Chief Information Officer has established architecture as a priority; however, no mechanism has been designated to provide DoD Components with the guidance and oversight needed to ensure that implementation of the JTA is coordinated and efficient. Unfunded mandates from DoD are unlikely to receive the attention that they require. We believe DoD oversight is necessary to maintain consistency in the JTA implementation process across the DoD and to effectively achieve interoperable systems.

## **Management Comments on the Finding and Audit Response**

**Management Comments.** The Acting Assistant Secretary concurred, with comment, on the report finding and discussion. Most of the Acting Assistant Secretary's comments revolved around the amount of detailed guidance that the Office of the Secretary of Defense should provide. The Acting Assistant Secretary stated that providing generalized policy and guidance to the DoD Components for JTA implementation planning reflected the current management philosophy of senior DoD leaders. Accordingly, the decision to give the Components the responsibility for developing the details needed to implement the JTA was conscious, considered, and appropriate. Because the Components were purposefully provided such wide latitude, the diverse approaches to JTA implementation mentioned in the report should be expected.

The Acting Assistant Secretary also commented on our statement that DoD had not established a formal process to oversee Component JTA implementation planning as of June 2, 1997. The Acting Assistant Secretary stated that the DoD did, in fact, have a team established to evaluate and provide feedback on Component plans. The Acting Assistant Secretary stated that we should clarify the report in regard to the potential standards conflict between the JTA and commercial, off-the-shelf software and that, in fact, an established process is available for resolving such conflict. The Acting Assistant Secretary also commented that we need to clarify that the JTA will be initially extended into weapon system domains in December 1997. Lastly, the Acting Assistant Secretary stated that the Chief Information Officer did develop a framework of strategic planning, policy, and guidance, which is in place and continues to be refined, to support JTA planning and implementation by the Components.

The complete text of management comments is in Part III of this report.

**Audit Response.** We agree that micromanagement should be avoided. However, the audit indicated that more effort is needed to assure progress toward JTA goals.

It is correct that ASD (C<sup>3</sup>I) initiated a review and evaluation of Component JTA implementation plans. Our draft report clearly described oversight plans, but also noted that, as of June 1997, oversight officials had not started those review efforts. We revised the discussion in this final report to more clearly describe the potential conflict between the standards required by the JTA and those to which some commercial software systems may be built. We clarified our concern about the resolution of those potential conflicts. We also made it clear that the JTA will be extended into weapon systems domains in the near-term.

We agree with the Acting Assistant Secretary that a framework of strategic guidance and policy for information technology has been initiated and is evolving. Those efforts were clearly acknowledged in the draft report. However, that framework had not been developed and was not in place at the time when the Components were tasked with developing JTA implementation

## **Implementation of the Joint Technical Architecture**

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plans. Without DoD-level statements on the priority, importance, or expected timeframes for JTA implementation, the diverse approaches set forth in the Components' implementation plans should be expected.

## **Recommendations, Management Comments, and Audit Response**

We recommend that the Under Secretary of Defense for Acquisition and Technology; the Acting Assistant Secretary of Defense (Command, Control, Communications, and Intelligence); and the Director for Command, Control, Communications, and Computers, Joint Staff, as Co-Chairpersons of the DoD Architecture Coordination Council:

- 1. Develop a methodology for cross-Service and cross-functional coordination of DoD Component Joint Technical Architecture implementation plans.**
- 2. Develop a methodology to measure and track Joint Technical Architecture implementation progress and success.**
- 3. Disseminate information that could impede or enhance Joint Technical Architecture implementation.**
- 4. Establish review mechanisms to periodically assess joint interoperability levels.**

**Management Comments.** The Acting Under Secretary of Defense for Acquisition and Technology, the Acting Assistant Secretary of Defense (Command, Control, Communications, and Intelligence), and the Joint Staff concurred with all recommendations. Management deferred providing associated action plans until support groups to the Architecture Coordination Council present those plans to the Architecture Coordination Council at its next meeting and the Council approves the plans. The Council is scheduled to meet in mid-November 1997.

**Audit Response.** Although management fully concurred with the recommendations, they deferred providing related action plans to us until after the next Architecture Coordination Council meeting, scheduled for mid-November 1997. To evaluate the Council's planned actions in a timely manner, we ask that the Under Secretary of Defense for Acquisition and Technology, the Acting Assistant Secretary of Defense (Command, Control, Communications, and Intelligence), and the Director for Command, Control, Communications, and Computers, Joint Staff provide those plans and associated timeframes by January 16, 1998.

## **Part II - Additional Information**

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## **Appendix A. Audit Process**

### **Scope and Methodology**

**Work Performed.** We evaluated DoD plans for implementing information processing standards as a means of achieving systems interoperability. We reviewed documents dated from September 11, 1990, through June 2, 1997, related to the planning and developing of Component JTA implementation plans. Specifically, we reviewed DoD guidance contained in JTA implementation memorandums dated August 22, 1996, and October 4, 1996. We also analyzed Component responses prepared in accordance with that guidance. In addition, we interviewed Army, Navy, and Air Force personnel who were responsible for drafting and implementing the JTA within their organizations.

**Limitation to Audit Scope.** We were unable to review all Component JTA implementation plans because not all Component responses included a plan.

**Use of Computer-Processed Data and Statistical Sampling.** We did not use computer-processed data or statistical sampling procedures for this audit.

**Audit Type, Dates, and Standards.** We performed this program audit from December 1996 through June 1997 in accordance with auditing standards issued by the Comptroller General of the United States, as implemented by the Inspector General, DoD. Accordingly, we included tests of management controls considered necessary.

**Contacts During the Audit.** We visited or contacted individuals and organizations within the DoD. Further details are available on request.

### **Management Control Program**

DoD Directive 5010.38, "Management Control (MC) Program," August 26, 1996, requires DoD organizations to implement a comprehensive system of management controls that provides reasonable assurance that programs are operating as intended and to evaluate the adequacy of the controls.

**Scope of Review of Management Control Program.** We reviewed the adequacy of Components' planned management controls for implementing the JTA. Specifically, we evaluated the management and oversight structure, and processes and responsibilities as described in the JTA implementation plans. We also evaluated existing and planned ASD(C<sup>3</sup>I) management controls for JTA

## **Appendix A. Audit Process**

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planning and implementation. We specifically evaluated control mechanisms for major DoD information technology initiatives and planned actions for developing specific management controls for JTA implementation.

**Adequacy of Management Controls.** We identified material control weaknesses for the ASD(C<sup>3</sup>I) as defined by DoD Directive 5010.38. The ASD(C<sup>3</sup>I) management controls had not been established to ensure that JTA planning was coordinated across DoD, to measure and track JTA implementation progress, or to assess improvements in joint interoperability levels. Recommendations 1, 2, and 4, when implemented, will improve ASD(C<sup>3</sup>I) oversight of JTA planning and implementation. A copy of the report will be provided to the senior official responsible for management controls in the Office of the Secretary of Defense.

**Adequacy of Management's Self-Evaluation.** Office of the ASD(C<sup>3</sup>I) officials did not identify JTA oversight as an assessable unit. Those officials did not specifically identify JTA oversight as an assessable unit because they believed there was no requirement to designate portions of their overall management control structure as individual assessable units.

### **Prior Coverage**

No prior audits on the JTA have been conducted within the last 5 years.

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## **Appendix B. Year 2000 Issue**

Many Government computer systems were designed and developed 20 to 25 years ago. Those computer systems use a variety of computer languages, some of which are old or obsolete. The systems contain tens of thousands of computer programs, some with millions of lines of code that must be examined for functions that use dates in performing calculations.

It is anticipated that the year 2000 will pose a problem for computer functions that use dates for calculations. For the past several decades, systems have typically used two digits to represent the year. For example, 1997 would be represented as "97." Using that method, the year 2000 would be represented by "00." Therefore, subtracting "97" from "00" will result in a negative number. Also, with only two digits, computer systems are unable to distinguish between the year 1900 and the year 2000. If not corrected, computer systems will not be able to correctly calculate dates, ages, schedules, or other functions that are essential to almost every DoD program. Such programs as military and civilian pay, retirement benefits, and promotions will be affected.

The year 2000 problem is critical because DoD cannot extend the time available to repair systems that will fail because they can not recognize the correct date. Consequently, the diversion of resources to support the resolution of year 2000 problems may affect the schedules and funding of almost all DoD information technology resource programs.

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## **Appendix C. Analysis of Component Joint Technical Architecture Implementation Plans**

On October 4, 1996, the ASD(C<sup>3</sup>I) provided supplemental guidance to the DoD Components for their development of JTA implementation plans. Specifically, the ASD(C<sup>3</sup>I) requested that the Components' implementation plans address the following topics:

- management and oversight structure, process, and responsibilities;
- approach to configuration management and control, to include ensuring that implementation feedback is identified and incorporated;
- implementation procedures and organizations overseeing the procedures;
- approach for issuing the JTA in specific functional domains, organizational elements, or systems (including existing and new ones), and the criteria for moving systems to JTA compliance;
- customer support;
- training and education initiatives;
- plans to integrate with other ongoing Component initiatives (for example, other technical architectures); and
- strategy for assessing progress toward implementation and interoperability.

As of June 2, 1997, the Office of the ASD(C<sup>3</sup>I) had received 17 responses. The responses varied in degree of detail and commitment. Of the 17 responses, 8 responses covered the topics in sufficient detail to be considered plans. Of the eight plans, three discussed each of the eight suggested topics. Of the remaining nine responses, three were requests for additional time to prepare or to finalize a plan, two were negative responses, one was a draft of an instruction, and three were letters outlining intentions. The following chart outlines the responses.

## **Appendix C. Analysis of Component Joint Technical Architecture Implementation Plans**

<b>Assessment of Component Responses to Request for JTA Implementation Plans</b>	
<b>DoD Component</b>	<b>Status and Assessment of Responses</b>
Advanced Projects Research Agency	Plan generally good; missing some topics.
Ballistic Missile Defense Organization	Plan is an outline/summary; covers all topics.
Defense Commissary Agency	Letter states that systems are compliant.
Defense Finance and Accounting Service	Plan complete; implementation will be through existing acquisition process.
Defense Information Systems Agency	Draft of an instruction; not a plan.
Defense Intelligence Agency	Plan complete; addresses all topics.
Defense Investigative Service	Plan generally good; missing some topics.
Defense Logistics Agency	Letter states intent to comply with JTA.
Defense Security Assistance Agency	Letter states they have no C <sup>4</sup> I* systems; therefore requirement to implement JTA does not apply.
Defense Special Weapons Agency	Requested an extension to January 17; no further response or plan has been submitted.
Department of the Air Force	Plan is complete; implementation will be through existing acquisition process.
Department of the Army	Plan is complete; addresses all topics.
Department of the Navy	Plan in draft form, but complete. Extension to January 15 requested; but no further response.
Inspector General	Letter states they have no C <sup>4</sup> I systems, so does not apply.
National Imagery and Mapping Agency	Requested an extension to January 30; no further response or plan has been submitted.
National Security Agency	Letter outlines intentions; no other response.
On-Site Inspection Agency	Intent to comply with JTA stated and requested an extension to January 24; no further response.

\*Command, control, communications, computers, and intelligence.

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## **Appendix D. Report Distribution**

### **Office of the Secretary of Defense**

Under Secretary of Defense for Acquisition and Technology

    Deputy Under Secretary of Defense for Logistics

    Director, Defense Logistics Studies Information Exchange

Under Secretary of Defense (Comptroller)

    Deputy Chief Financial Officer

    Deputy Comptroller (Program/Budget)

Assistant Secretary of Defense (Command, Control, Communications, and Intelligence)

Assistant Secretary of Defense (Public Affairs)

Director, Administration and Management

### **Joint Staff**

Director, Joint Staff

Director, Command, Control, Communications, and Computers

### **Department of the Army**

Assistant Secretary of the Army (Financial Management and Comptroller)

Director, Information Systems for Command, Control, Communications, and  
    Computers

Auditor General, Department of the Army

### **Department of the Navy**

Assistant Secretary of the Navy (Financial Management and Comptroller)

Commander, Space and Naval Warfare Systems Command

Auditor General, Department of the Navy

### **Department of the Air Force**

Assistant Secretary of the Air Force (Financial Management and Comptroller)

Deputy Chief of Staff, Communications and Information

Auditor General, Department of the Air Force

## **Appendix D. Report Distribution**

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### **Other Defense Organizations**

Director, Defense Contract Audit Agency  
Director, Defense Information Systems Agency  
Director, Defense Logistics Agency  
Director, National Security Agency  
Inspector General, National Security Agency  
Inspector General, Defense Intelligence Agency

### **Non-Defense Federal Organizations and Individuals**

Office of Management and Budget  
Technical Information Center, National Security and International Affairs Division,  
General Accounting Office

Chairman and ranking minority member of each of the following congressional  
committees and subcommittees:

Senate Committee on Appropriations  
Senate Subcommittee on Defense, Committee on Appropriations  
Senate Committee on Armed Services  
Senate Committee on Governmental Affairs  
House Committee on Appropriations  
House Subcommittee on National Security, Committee on Appropriations  
House Committee on Government Reform and Oversight  
House Subcommittee on Government Management, Information, and Technology,  
Committee on Government Reform and Oversight  
House Subcommittee on National Security, International Affairs, and Criminal  
Justice, Committee on Government Reform and Oversight  
House Committee on National Security

## **Part III - Management Comments**

# Under Secretary of Defense for Acquisition and Technology Comments



THE UNDER SECRETARY OF DEFENSE  
3010 DEFENSE PENTAGON  
WASHINGTON, D.C. 20301-3010



SEP 24 1997

## MEMORANDUM FOR THE INSPECTOR GENERAL, DEPARTMENT OF DEFENSE

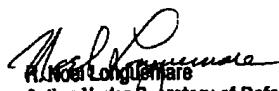
SUBJECT: Response to O10, DoD, Draft Audit Report, "Implementation of the Joint Technical Architecture" (Project No. 7RE-0019), July 31, 1997

Thank you for the opportunity to review and comment on your draft audit report. In conformance with DoDD 7650.3, we concur with its recommended corrective actions.

Corrective actions associated with the recommendations will be undertaken and overseen by the Architecture Coordination Council (ACC) as advocated in the report. Support groups to the ACC are currently formulating an action plan that will be presented to the ACC at the next meeting, scheduled for mid-November. Upon the ACC's acceptance of the plan, we will forward our approach to the recommended corrective actions to your office.

We appreciate the positive exchanges we have had with the members of the O10 audit team; please thank them for their efforts.

My point of contact for this action is the Director of the Open Systems Joint Task Force, Mr. Leonard Burke, at (703) 578-6568.

  
R. Noel Longmire  
Acting Under Secretary of Defense  
(Acquisition and Technology)



# Assistant Secretary of Defense (Command, Control, Communications, and Intelligence) Comments



ASSISTANT SECRETARY OF DEFENSE  
6000 DEFENSE PENTAGON  
WASHINGTON, DC 20301-6000



September 29, 1997

COMMAND, CONTROL,  
COMMUNICATIONS, AND  
INTELLIGENCE

MEMORANDUM FOR INSPECTOR GENERAL, DOD

Govt's 9/29  
Send to AIG

SUBJECT: Response to OIG, DoD, Draft Audit Report,  
"Implementation of the Joint Technical Architecture"  
(Project No. 7RE-0019), July 31, 1997

Thank you for the opportunity to review and comment on your July 31, 1997, draft audit report, subject as above. In conformance with the requirements of DoDD 7650.3, we concur with the recommended corrective actions stated in subject report. We concur with comment in the findings and conclusions. Our comments on the report's findings and conclusion are attached.

Corrective actions associated with the recommendations will be undertaken and overseen by the Architecture Coordination Council (ACC) as advocated in the report. Support groups to the ACC are currently formulating an action plan that will be presented to the ACC at the next meeting scheduled for mid-November. Upon acceptance of the action plan by the ACC, we will forward our approach to the recommended corrective actions to your office.

We appreciate the exchanges we have had with the members of the OIG audit team and thank them for their effort. Please incorporate this memorandum, along with the attachment, in the final report.

My point of contact for this action is Mr. Terry Hagle, who is assigned to my Deputy Assistant Secretary of Defense for Command, Control and Communications, telephone: (703) 614-6662, or Mr. Samuel Worthington, telephone: (703) 614-6132.

Anthony M. Valletta  
(Acting)

Attachment



## **Assistant Secretary of Defense (Command, Control, Communications, and Intelligence) Comments**

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### **Response to the Office of the Inspector General(OIG), DoD Draft Audit Report "Implementation of the Joint Technical Architecture", Project No. 7RE-0019 Draft dated July 31, 1997**

#### **General:**

Department guidance, with respect to efforts like the implementation of the Joint Technical Architecture (JTA), reflects the management philosophy of the senior leadership. Most recently, the philosophy reflects a management direction of less "central control," not more. The management philosophy has been to provide broad strategic guidance to the Services and Agencies and not to micro-manage. The guidance provided with respect to the implementation of the JTA reflects this philosophy.

#### **Specific:**

##### **Page 4:**

**First Para., Report States:** "...planning guidance...did not establish:

- the priority of JTA implementation relative to other DoD information technology initiatives,
- a JTA implementation schedule, ..."

The report also mentions a "lack of strategic guidance".

**Comment:** The USD(A&T) and the ASD(C3I) made a considered policy decision to give the Components responsibility for JTA planning, enforcement, budgeting and pace of implementation. Clearly Senior management intended to place implementation responsibility with the Components. Consistent with this responsibility, each Component has the responsibility to coordinate with other Components. This is particularly so with the Services and major Agencies. The Information Technology Management (ITM) Strategic Plan, March 1997, clearly describes architecture, in particular the JTA, as a major objective which DoD Components must support and accomplish. With respect to the JTA, the plan states that infrastructure elements and applications should be JTA compliant by the year 2002. In addition, the Chief Information Officer (CIO) Business Plan, May 1997, reflects the importance of architecture, describing it as one of the major priorities for the CIO. The JTA is prominently mentioned as a major element of the CIO's strategy for promoting the implementation of a "sound and integrated information technology architecture".

##### **Page 5**

**Fourth Para., Report States:** Compliance with Implementation Guidance. "Overall the responses were incomplete and inconsistent."

## Assistant Secretary of Defense (Command, Control, Communications, and Intelligence) Comments

Final Report  
Reference

**Comment:** The generality of the statement gives no credit to the Services and Agencies that did in fact follow the guidance. All three Services, DIA, DFAS, and others submitted detailed plans which did follow the guidance.

**Page 6**

**First Para., Report States:** "None of the plans gave estimates of implementation costs and how they would be budgeted."

Page 5

**Comment:** As stated above the USD(A&T) and ASD(C3I) made a policy decision to give the Components responsibility for enforcement, budgeting, and pace of implementation of the JTA. Reflecting this philosophy, the guidance did not request specific budget information.

**Fourth Para., Report States:** "As of June 2, 1997, the DoD did not have a formal process to receive, track, evaluate, or provide feedback on the Component JTA implementation plans."

**Comment:** The DoD did in fact have a team established to evaluate and provide feedback on Component plans. The team had established objectives, a schedule for completing the evaluation, and evaluation criteria. Evaluation of Service plans was completed by the team in July and evaluation of Agency plans was underway. Upon acceptance of the IG recommendations by the Architecture Coordination Council (ACC), the team ceased its independent efforts in favor of working with the ACC infrastructure groups to determine the best way to proceed with implementing the IG recommendations.

**Fifth Para., Report States:** Diverse Approaches to Implementation. "...the Components took diverse approaches to the JTA implementation."

**Comment:** Diverse approaches to JTA implementation would be expected under the Services Title 10 responsibilities. Though there are some limitations, under Title 10 the Services have the prerogative to manage the acquisition function that would determine their approaches to JTA implementation. The Air Force stated on numerous occasions that the approach to implementation was their prerogative. The other Services and OSD agreed with this position. The challenge for the Department, and in particular for the ACC, is the measuring and tracking of implementation progress and success given the diverse approaches of the Services.

**Page 8**

**Second Para., Report States:** "While the JTA will eventually be extended into the weapon systems domain, the Army has already begun to extend its technical architecture into its weapons systems."

Revised  
Page 7

## Assistant Secretary of Defense (Command, Control, Communications, and Intelligence) Comments

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Page 9

**Second Para., Report States:** "...the use of commercial-off-the-shelf software and the JTA may not be complimentary...."

**Comment:** It should be made clear that the JTA and commercial-off-the-shelf (COTS) are not mutually exclusive. The overwhelming majority of standards included in the JTA are based on international/national standards and do have ample COTS products that conform to the standard.

**Third Para., Report States:** "The DoD does not have a specific process for resolving conflicts between competing initiatives."

**Comment:** The statement is untrue. Where there are issues of conflict with respect to standards or interoperability the Military Communications Electronics Board can and does intervene to resolve the issue. If the issue relates specifically to architecture, the ACC intervenes to resolve the issue.

**Fourth Para., Report States:** "...until all three are defined, interoperability will not be achieved..."

**Comment:** In this Department interoperability can only be achieved through incremental steps. The JTA is one increment. The JTA will have an immediate impact on the interoperability issue in the DoD. No doubt having the Joint Operational Architecture available will enhance our ability to make decisions concerning the requirements for interoperability within specific domains and/or environments. The overall process is evolving, but requires considerable time and effort to put in place.

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Page 11

**Second Para., Report States:** "...it is the responsibility of the Office of Secretary of Defense to establish a framework of strategic planning, policy, and guidance to support those plans."

**Comment:** Such a framework has been established and continues to be worked. Already the CIO has put in place his ITM Strategic Plan and his Business Plan ensuring that architecture, in particular the JTA, is a major priority. The ACC is working to modify all pertinent DoD policies that deal with architecture, incorporating the JTA as a priority in all such policies. In particular the policies that govern the three major processes in the Department (requirements generation, resource allocation, and

**Assistant Secretary of Defense (Command, Control, Communications, and Intelligence) Comments**

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acquisition) are being reviewed to ensure that architecture is properly contained to appropriately impact the decision making in each of these three major processes. With respect to the guidance provided to date, OSD feels that it is both prescriptive to the extent necessary and appropriate to achieve the desired result.

# Joint Staff Comments



THE JOINT STAFF  
WASHINGTON, DC

Reply ZIP Code:  
20318-0300

DJSM-859-97  
8 October 1997

## MEMORANDUM FOR THE DEPARTMENT OF DEFENSE INSPECTOR GENERAL

Subject: Audit Report on Implementation of the DOD Joint Technical Architecture (Project No. 7RE-0019)

1. In response to your request<sup>1</sup> and in conformance with the requirements of DODD 7650.3,<sup>2</sup> the Joint Staff concurs in the findings, conclusions, and recommended corrective actions stated in subject report.
2. Mr. John Maher of the Command, Control, Communications, and Computer Systems Directorate is separately coordinating with the combatant commands to obtain and aggregate the various CINC Joint Technical Architecture (JTA) implementation plans, as well as developing the Joint Staff JTA Implementation Plan, for a November 1997 submittal to OASD(CSI).
3. Additionally, the Director for Command, Control, Communications, and Computer Systems, as a cochairperson of the Architecture Coordination Council, will coordinate Joint Staff assistance to the Council in determining how to implement the four corrective actions stated in subject report.

A handwritten signature in black ink, appearing to read "STR".

STEPHEN T. RIPPE  
Major General, USA  
Vice Director, Joint Staff

### References:

- 1 DODIG memorandum, 31 July 1997, "Audit Report on Implementation of the DoD Joint Technical Architecture (Project No. 7RE-0019)"
- 2 DODD 7650.3, 5 September 1989, "Followup on General Accounting Office, DoD Inspector General, and Internal Audit Reports"

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## INTERNET DOCUMENT INFORMATION FORM

**A . Report Title:** Implementation of the DOD Joint Technical Architecture

**B. DATE Report Downloaded From the Internet:** 09/28/99

**C. Report's Point of Contact:** (Name, Organization, Address, Office Symbol, & Ph #): OAIG-AUD (ATTN: AFTS Audit Suggestions)  
Inspector General, Department of Defense  
400 Army Navy Drive (Room 801)  
Arlington, VA 22202-2884

**D. Currently Applicable Classification Level:** Unclassified

**E. Distribution Statement A:** Approved for Public Release

**F. The foregoing information was compiled and provided by:**  
**DTIC-OCA, Initials:** \_\_VM\_\_ **Preparation Date** 09/28/99

The foregoing information should exactly correspond to the Title, Report Number, and the Date on the accompanying report document. If there are mismatches, or other questions, contact the above OCA Representative for resolution.

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